GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, KABLANA (JHAJJAR)

An Autonomous Institute

'A' GRADE ACCREDITED BY NAAC

Scheme of Examinations & Syllabus For

Master of Technology (Manufacturing and Automation) 2nd Year

(Effective from the Session: 2025-26)

APPROVED BY AICTE, NEW DELHI AND AFFILIATED TO MDU, ROHTAK

1. DEFINITION OF CREDIT

1	1 Lecture (L) per week	1 Credit
2	2 Practical (Lab) per week	1 Credit
3	2 Seminar per Week	2 Credit
4	4 Project per Week	2 Credit

2. RANGE OF CREDIT

A credits of 86 for a student to be eligible to get Post Graduate degree in Manufacturing and Automation.

3. STRUCTURE OF MASTER OF TECHNOLOGY (MANUFACTURING AND AUTOMATION)

Sr. No.	**Category**	**Breakup of Credits**
1	Professional Core Courses	32
2	Professional Elective Courses	8
3	Multidisciplinary Open Elective Courses	6
4	Foundation Elective Courses	3
5	Mandatory Learning Course	3
6	Seminar	6
7	Lab Courses	4
8	Project	2
9	Dissertation	22
	Total Credits	86

4. COURSE CODE AND DEFINITIONS

Sr. No.	Category	Course Code
1	Professional Core Courses	PCC
2	Professional Elective Courses	PEC
3	Multidisciplinary Open Elective Courses	OEC
4	Foundation Elective Courses	FEC
5	Mandatory Learning Course	MLC
6	Seminar	SM
7	Lab Courses	LC
8	Project	PROJ
9	Dissertation	DISS

GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, KABLANA, JHAJJAR (HR.)

Scheme of Studies and Examination

M.Tech (Manufacturing and Automation) -3rd Semester

w.e.f. 2025-26

Sr. No.	Category	Course Code	Course Title	Hours per week			Total Load Per Week	Credits	Examination Scheme (Marks)				Exam Duration in H
				Lecture (L)	Tutorial (T)	Practical (P)			Assessment	End Semester Examination		Total	
										Theory	Practical		
1	Professional Core Courses	PCC-MTMA-201A	Manufacturing Automation	4	0	0	4	4	40	60		100	3
2	Professional Elective Courses	Refer Table -IV	.....	4	0	0	4	4	40	60		100	3
3	Mandatory Learning Course	MLC-01A	Research Methodology and IPR	3	0	0	3	3	40	60		100	3
4	Multidisciplinary Open Elective Courses	Refer Table -V	.....	4	0	0	4	3	40	60		100	3
6	Project Courses	PROJ-MTMA-213A	Project	0	0	4	4	2	50		50	100	3
6	Seminar	SM-MTMA-215A	Seminar-III	0	0	4	4	2	50			50	
7	Dissertation	DISS-MTMA-217A	Dissertation (Phase-I)	0	0	4	4	2	100			100	
Total Credits								**20**				**650**	

GANGA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, KABLANA, JHAJJAR (HR.)

Scheme of Studies and Examination

M.Tech (Manufacturing and Automation) -4th Semester

w.e.f. 2025-26

Sr. No.	Category	Course Code	Course Title	Hours per week			Total Load Per Week	Credits	Examination Scheme (Marks)				Exam Duration in H
				Lecture (L)	Tutorial (T)	Practical (P)			Assessment	End Semester Examination		Total	
										Theory	Practical		
1	Dissertation	DISS-MTMA-202A	Dissertation (Phase-II)	-	-	-	-	20	250		500	750	
Total Credits								**20**				**750**	

Table IV (Program Elective Courses)

Course Code	Course Title
PEC-MTMA-203A	Production, Planning and Control
PEC-MTMA-205A	Advanced Metrology and Calibration
PEC-MTMA-207A	Industrial Inspection
PEC-MTME-209A	Industrial Robotics
PEC-MTME-211A	Supply Chain Management

Table V (Multidisciplinary Open Elective-II Courses)

Students of all PG programmes are required to study one multidisciplinary open elective course in 3rd Semesters for 2-Years Programmes. They may choose any one of the following courses (excluding the courses offered by the departments of their own subjects, if not stated otherwise).

SN	Courses Code	Course Title	Offered by Department
1	OEC-131A	Fundamental of Income Tax	Management Department
2	OEL-133A	Stress Management	Management Department
3	OEC-135A	Fundamental of Marketing	Management Department
4	OEC-137A	Business Analytics	Management Department
5	OEC-139A	Statistical Tools using SPSS	Applied Sc. & Humanities (Mathematics)
6	OEC-141A	Mathematical Techniques and Applications	Applied Sc. & Humanities (Mathematics)
7	OEC-143A	MATLAB	Electrical Engineering
8	OEC-145A	Source of Energy-II	Electrical Engineering
9	OEC-147A	Natural and Manmade Disaster	Civil Engineering
10	OEC-149A	Optimization Techniques	Computer Sc. & Engineering
11	OEC-151A	Composite Materials	Mechanical Engineering
12	OEC-153A	Cost Management of Engineering Projects	Mechanical Engineering
13	OEC-155A	Voice and Data Network	Electronics & Communication Engineering
14	OEC-157A	IT for Professionals	Computer Sc. & Applications

Course Code	**PEC-MTMA-205A**				
Category	Professional Elective Courses				
Course Title	**Advanced Metrology and Calibration**				
Scheme and Credits	L	T	P	**Credits**	**Semester-III**
	4	0	0	**4**	
Course Objectives	The objectives of this course are • Learn the working principles of various measuring instruments for geometrical tolerances and surface finish. • Gain knowledge of calibration procedures for mechanical measuring tools and instruments. • Learn fundamental concepts of dimensional tolerances, fits, and surface texture parameters. • Enhance skills to calculate measurement uncertainties for different metrological instruments.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	**Skills Demonstrated**
CO1	Define the concepts of fit, tolerance systems, surface texture parameters, and standard measuring tools.
CO2	Explain the principles of geometrical tolerances, measuring instruments, and calibration procedures for dimensional metrology.
CO3	Apply appropriate instruments for advanced metrology and calibration of component.
CO4	Analyze the impact of fundamental deviations, measurement techniques, instrument calibration, and uncertainty calculations on precision and quality in mechanical metrology.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit No.	**Contents**
Unit-I	Fundamental deviation and its calculations, effect of tolerance on the fits, effects of electroplating on the fits and its solution, shaft basis and hole basis system and its applications, Go, No- Go gauge design, tolerance position and tolerance for bolt and nut. Geometrical Tolerances. Surface erosion form, macro and micro errors, reasons for these errors. Surface texture parameters, amplitude, spacing and hybrid, bearing ratio/ ABBOTT-Fire Stone curve, Average Slope
Unit-II	Measuring instrument for flatness & surface finishes, instrument for geometrical tolerances, profile projector, co-ordinate measuring machine, laser micrometre, various grades of slip gauges and pin gauges, auto collimeters, various types of micrometre
Unit-III	Introduction to calibration, calibration of mechanical measuring instruments, micrometres depth- micrometre, Vernier calliper, tool maker microscope, pin gauge, surface plate, dial gauges, optical flats, slip gauges.
Unit-IV	Calculation of uncertainty, both A type & B type, for micrometres, Vernier Callipers and co-ordinate measuring Machine

Suggested Readings

1. Engineering Metrology and Instrumentation by R.K. Rajput.
2. ISI–Standard919andISI-Standard4218.
3. Engineering Tolerances by H.G. Conway

Useful Video links

Unit No.	Topic	Link
UNIT-I	Fundamental	https://nptel.ac.in/courses/112104250
	Limit, fit, and tolerance	https://nptel.ac.in/courses/112106179
UNIT-II	Measuring instrument for flatness	https://nptel.ac.in/courses/112106179
	Various type of micrometre	https://nptel.ac.in/courses/112104250
UNIT-III	Introduction to calibration	https://nptel.ac.in/courses/112106139
	Vernier calliper	https://nptel.ac.in/courses/112106140
UNIT-IV	Calculation of uncertainty	https://nptel.ac.in/courses/112106138
	Coordinate measuring Machine	https://nptel.ac.in/courses/112104250

Course Code	**PEC-MTMA-207A**				
Category	Professional Elective Courses				
Course Title	**Industrial Inspection**				
Scheme and Credits	L	T	P	**Credits**	**Semester-III**
	4	0	0	**4**	
Course Objectives	The objectives of this course are • To learn methods for inspection and measurement of threads, gears, and dimensional features. • To study surface texture characteristics, measurement techniques, and process gauging methods. • To comprehend geometrical and positional tolerances and the physical limitations of measurement devices.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	**Skills Demonstrated**
CO1	Define fundamental principles of design, material selection, and tolerance standards relevant to gauges, threads, gears, and surface textures.
CO2	Explain various measurement and inspection methods for dimensional and geometrical accuracy.
CO3	Apply measurement instruments and process gauging techniques to solve industrial inspection related problems.
CO4	Analyze geometrical and positional tolerances while considering the limitations and calibration of measuring devices for quality control.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit No.	**Contents**
Unit-I	Design consideration for Gauges and measuring instruments: material selection for gauges, hardness and surface finish, tolerance for linear and dimensional chains, limits, fits and tolerance as per Indian and international standards, design of plug gauge, snap gauge, center distance gauge.
Unit-II	**Inspection of threads and gears**: thread gauge design, thread size measurement by two wire and three wire methods, Vernier gear tooth gauge design.
Unit-III	**Surface textures**: components of machined surface texture, specification of surface texture, surface roughness measuring device and techniques, design of pneumatic gauges in process gauging methods.
Unit-IV	Geometrical and positional tolerances, Geometrical and physical limitations in measuring devices.

Suggested Readings

1. Metrology: I.C. Gupta (Dhanpat Rai Pub.).
2. Engg. Metrology: R. K. Rajput (S. K. Kataria and sons).
3. Metrology: R. K. Jain.

Useful Video links

Unit No.	Topic	Link
UNIT-I	Design consideration for Gauges and measuring instruments	https://nptel.ac.in/courses/112104250
UNIT-II	https://nptel.ac.in/courses/112104250	https://nptel.ac.in/courses/112106179
UNIT-III	Surface textures	https://nptel.ac.in/courses/112106179
UNIT-IV	Geometrical and positional tolerances	https://nptel.ac.in/courses/112103261

Course Code	**PEC-MTME-209A**				
Category	Professional Elective Courses				
Course Title	**Industrial Robotics**				
Scheme and Credits	L	T	P	**Credits**	**Semester-III**
	4	0	0	**4**	
Course Objectives	The objectives of this course are • To introduce to the concept of robotics. • To gain the knowledge of kinematics, dynamics, and control of robot manipulators. • To familiarize students with robotic actuators, sensors, and end-effectors for various industrial applications.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	**Skills Demonstrated**
CO1	Recall the fundamental concepts of mechanical vibration.
CO2	Explain the vibration behaviour of mechanical systems using theoretical, mathematical, and experimental approaches.
CO3	Apply analytical and numerical methods to solve vibration problems.
CO4	Analyze the vibration characteristics of engineering systems.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit No.	**Contents**
Unit-I	**Introduction to Robotics**: Evolution of Robots and Robotics, Laws of Robotics, Progressive advancement in Robots. Robot anatomy, Human Arm Characteristics, Design and Control issue, Manipulation and Control, Programming Robots. **Coordinate Frames, Mapping and Transforms**: Coordinate Frames, Description of objects in space, Transformation of Vectors, Inverting a Homogeneous Transform, Fundamental Rotation matrices.
Unit-II	**Direct Kinematic Model**: Mechanical structure and notations, Kinematic modelling of the manipulator, Denavit Hartenberg Notation, Manipulator Transformation Matrix. **The Inverse Kinematics:** Manipulator workspace, solvability of Inverse kinematics model, solution techniques, closed form solution.
Unit-III	**Manipulator Differential Motion and Statics**: Linear and angular velocity of a rigid body, relationship between transformation matrix and angular velocity, manipulator Jacobian, Jacobian Inverse, Jacobian Singularities, Static Analysis. **Dynamic Modelling**: Largrangian Mechanics, Two Degree of Freedom manipulator dynamic Model, Lagrange-Euler formulation Newton-Euler formulation, Inverse Dynamics.
Unit-IV	**Control of Manipulators:** Open and Close loop control, linear control schemes, linear second order SISO model of a manipulator joint. Joint Actuators, Computed Torque Control, force control of Robotics, Manipulators, Hybrid position/force control, Impedance Force/Torque Control. **Robotic Sensors:** Sensors in Robotics, classification of Robotic sensors, kinds of sensors used in robotics-Acoustic sensors optic, Pneumatic, force/Torque sensors.

Suggested Readings

1. Fundamental of Robotics by Robert J. Schilling Prentice Hall of India.
2. Introduction to Robotics by Saeed B. Niku Pearson Education Asia.
3. Robot Modelling and kinematics by Rashid Mansour, Laxmi Publications.
4. Robotics Control, Sensing, Vision and Intelligence, K. S. Fu, R. C. Gonzalez and C.S.G. Lee, McGraw-Hill, 1st Edition, 1987.

Useful Video links

Unit No.	Topic	Link
UNIT-I	Robot anatomy	https://youtu.be/rYWJdZ5qg6M?si=2SAVtIH2CeXvQJlq
	Design and Control issue	https://www.youtube.com/watch?v=aa3KDFCSmJ0
	Manipulation and Control	https://youtu.be/74d4vauVcWQ?si=uXyVULGAe8AlnaT1
	Programming Robots	https://www.youtube.com/watch?v=rYWJdZ5qg6M
UNIT-II	Denavit Hartenberg Notation	https://www.youtube.com/watch?v=FMWFDBhL6FQ
	Manipulator Transformation Matrix	https://youtu.be/74d4vauVcWQ?si=paGQubB75ATQ092E
	Solvability of Inverse kinematics model	https://www.youtube.com/watch?v=unwUt3kkgvE
UNIT-III	Linear and angular velocity of a rigid body	https://www.youtube.com/watch?v=oG6-zmspAvc
	relationship between transformation matrix and angular velocity	https://www.youtube.com/watch?v=iFOTm4lwPGA
	Jacobian Singularities	https://www.youtube.com/watch?v=UrKWTE5YSDI
UNIT-IV	linear second order SISO model of a manipulator joint	https://www.youtube.com/watch?v=A5JRXKWQpbs
	Acoustic sensors optic	https://www.youtube.com/watch?v=tD3q5a8LPUc

Course Code	**PEC-MTME-211A**				
Category	Professional Elective Courses				
Course Title	**Supply Chain Management**				
Scheme and Credits	L	T	P	**Credits**	**Semester-III**
	4	0	0	**4**	
Course Objectives	The objectives of this course are • To develop an in-depth understanding of supply chains. • To explain the concept of strategic fit. • To explore the key drivers of supply chain performance. • To learn the role and design of supply chain networks. • To know the design of distribution networks.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	**Skills Demonstrated**
CO1	Define the fundamental concepts of supply chain management.
CO2	Explain the concepts of strategic fit and the scope of strategic decisions in aligning supply chain performance with business goals.
CO3	Apply forecasting and aggregate planning techniques to match supply and demand effectively in a supply chain.
CO4	Analyze the design of distribution networks and their application.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit No.	**Contents**
Unit-I	**Introduction to Supply Chain Management:** Understanding the Supply Chain. Supply Chain Performance: Competitive and Supply Chain Strategies, achieving Strategic Fit and Scope of Strategic Fit.
Unit-II	**Supply Chain Drivers and Metrics:** Drivers of Supply Chain Performance, Framework for structuring Drivers, Facilities, Inventory, Transportation, Information, Sourcing and Pricing, Case Study: Seven Eleven Japan Company.
Unit-III	**Planning Demand and Supply in a Supply Chain:** Demand Forecasting in a Supply Chain, Aggregate Planning in a Supply Chain. Designing Distribution Networks and Application to E Business- Role of distribution, factors influencing distribution network design, design options for a distribution network, E-Business and the distribution network.
Unit-IV	**Network Design in the Supply Chain:** Role of network design in the supply chain, factors influencing network design decisions, Role of Information Technology in supply chain, coordination in a supply chain, Bullwhip Effect, Effect on performance due to lack of coordination, obstacles to coordination in a supply chain.

Suggested Readings

1. Supply Chain Management: Strategy, Planning & Operation, Sunil Chopra & Peter Meindle, Pearson.
2. Logistical Management: The integrated Supply Chain Process, Donald J. Bowersox & David J. Closs, TMH Publication

Useful Video links

Unit No.	Topic	Link
UNIT-I	Introduction to Supply Chain Management	https://www.youtube.com/watch?v=raqi4gjMLm8
	Supply Chain Strategies	https://www.youtube.com/watch?v=l9mebE3CGBQ&t=1s
UNIT-II	Drivers of Supply Chain Performance	https://www.youtube.com/watch?v=ZiUCB6HDc-8
	Inventory	https://www.youtube.com/watch?v=b6ElgF9TymU&t=2s
UNIT-III	Demand Forecasting in a Supply Chain	https://www.youtube.com/watch?v=tCnFx6VfPUA
	Designing Distribution Networks	https://www.youtube.com/watch?v=-5m3vPMlV70
UNIT-IV	Role of network design in the supply chain	https://www.youtube.com/watch?v=iSr5SrQ5kZM&t=2s
	Role of Information Technology in supply chain, coordination in a supply chain	https://www.youtube.com/watch?v=mW2vJq-KYfw

Course Code	**MLC-01A**				
Category	Mandatory Learning Course				
Course Title	**Research Methodology and IPR**				
Scheme and Credits	L	T	P	**Credits**	**Semester-III**
	3	0	0	**3**	
Course Objectives	The objectives of this course are: • To enable students to identify and define research problems, formulate objectives and apply appropriate investigative approaches in research methodology. • To impart knowledge of data sources, data collection methods, data processing and the application of statistical tools for research analysis. • To develop awareness of research ethics, plagiarism issues and effective practices in technical writing, report preparation, and research documentation. • To provide a comprehensive understanding of intellectual property rights, patent procedures, technology transfer and international frameworks for innovation protection.				
Assessment	40 Marks				
End Semester Examination	60 Marks				
Total Marks	100				
Duration of Exam	03 Hours				

Course Outcomes: After studying this course, the students will be able to

COs	**Skills Demonstrated**
CO1	Identify research problems, objectives, and data sources based on fundamental research methodology principles.
CO2	Explain intellectual property rights, patent procedures, and international frameworks for technology transfer and innovation protection.
CO3	Apply research ethics to prepare plagiarism-free technical reports, research papers, and proposals using effective writing and presentation techniques.
CO4	Analyze research data through classification and tabulation to extract meaningful patterns and conclusions using statistical tools and methods.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 8 parts (2 from each unit/section) of 1.5 marks each and remaining eight questions of 12 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit No.	**Contents**
Unit-I	Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem, Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations
Unit-II	Effective literature studies approaches, analysis, Plagiarism, Research ethics, Effective technical writing, how to write the report, Paper, Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee.
Unit-III	Sampling Methods, Need, Meaning & Type of Sample, Sources of Data, Primary and Secondary, Classification and Tabulation of Data Processing, Analysis and Interpretation of Data, Chi Square Test, significance of statistics in Socio-legal Research, Use of Computer in the Research field work and report writing.

Unit-IV	Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, and development. International Scenario: International cooperation on Intellectual Property, Procedure for grants of patents, Patenting under PCT. Patent Rights: Scope of Patent Rights, Licensing and transfer of technology.

Suggested Readings:

- Research Methodology: Methods and Techniques (4th ed.) by Kothari, C. R., & Garg, G, New Age International Publishers.
- Research Methodology: A Step-by-Step Guide for Beginners (4th ed.). by Kumar, R, SAGE Publications India. ISBN: 978-9351501337
- Intellectual Property: The Law of Trademarks, Copyrights, Patents, and Trade Secrets (6th ed.) by Bouchoux, D. E, Cengage Learning.
- Intellectual Property Rights Under WTO by T. Ramappa, S. Chand.

Useful Video links

Unit No	Topics	Links
Unit-I	Defining/formulating research problem Research types, descriptive, analytical, action, empirical, research methodology	https://www.youtube.com/watch?v=oTc4_zjmev0 https://www.youtube.com/watch?v=tjDBPRoyDJA
Unit-II	Types of Plagiarism Research Ethics	https://www.youtube.com/watch?v=5--ssYqyWoE https://www.youtube.com/watch?v=4tRCov8pVgQ
Unit-III	Primary data and Secondary Data. Sampling techniques	https://www.youtube.com/watch?v=caUiRsg5M6k https://www.youtube.com/watch?v=sKtoW5cXt14
Unit-IV	Patent Trademarks and Copyrights. What is Patent? Patent Filing Procedure in India.	https://www.youtube.com/watch?v=XQ8tRdcr0xQ https://www.youtube.com/watch?v=azMNhrkRzww

Course Code	**PROJ-MTMA-213A**				
Category	Project Course				
Course Title	**Project**				
Scheme and Credits	L	T	P	**Credits**	**Semester-III**
	0	0	4	2	
Course Objectives	The objectives of this course are to • Identify suitable research topics in relevant field for independent investigation. • Understand research methodologies, documentation, and referencing aligned with existing literature. • Develop technical writing skills using appropriate tools, formats, and referencing techniques. • Analyze, interpret, and synthesize research findings within a defined research scope or topic.				
Assessment	50 Marks				
End Semester Examination	50 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated
CO1	Identify complex engineering problems relevant to project work based on domain knowledge and real-world challenges.
CO2	Describe the workflow, technical background, and tools required for planning and executing engineering projects.
CO3	Apply appropriate methods, tools, and techniques to carry out project development and prepare technical documentation.
CO4	Analyze the key stages of project development to ensure systematic execution and identify performance issues.
CO5	Evaluate alternative approaches and select suitable methodologies to achieve optimal and feasible project outcomes.
CO6	Design innovative and practical engineering solutions to address societal and industrial needs.

Each student is required to carry out a hardware-based project and submit the project report. The project title and objectives should be chosen by the student in consultation with their allocated Project Guide.

Evaluation Criteria (Total: 50 marks)

Sr. No.	Evaluation Parameter	Marks
1	**Problem Definition and Relevancy** - clarity of problem, significance and alignment with discipline	5
2	**Proposed Solution and Implementation** - functionality, originality, technical depth.	5
3	**Project Benefit and Impact** - benefits to society, industry, and environment.	10
4	**Cost-Effectiveness and Practical Viability** - consideration of cost, resources, and practicality.	10
5	**Presentation and Communication Skills (Viva-voce)** - ability to explain, answer questions, confidence, and depth of knowledge.	10
6	**Project Report Quality** - clarity, completeness, format, and technical content.	10

Course Code	**SM-MTMA-215A**				
Category	Seminar				
Course Title	**Seminar-III**				
Scheme and Credits	L	T	P	**Credits**	**Semester-III**
	0	0	2	2	
Course Objectives	The objectives of this course are to • Develop students' ability to effectively present research topics and findings by effective communication. • Improve problem-solving and critical thinking skills of thestudents. • Expose students to the latest trends and advancements byreviewing and discussing contemporary research.				
Assessment	50 Marks				
End Semester Examination	-				
Total	50 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	**Skills Demonstrated.**
CO1	Identify the trends and advancements in the related field.
CO2	Analyze and synthesize research literature with in-depth reviews of key studies andmethodologies.
CO3	Undertake problem identification, formulation, proposing solution and analyze the impact on society, economy and environment.
CO4	Prepare a well-organized report employing elements of effective communication and critical thinking.
CO5	Demonstrate a sound technical knowledge of their research field.

Overview:

This course helps M. Tech students improve their research presentation skills. It focuses on choosing a topic or research paper related to their field, reviewing it thoroughly and presenting the findings clearly and effectively.

General Guidelines:

Topic Selection	Each student is required to choose the research topic based on publishedreview paper(s) or literature related to their relevant field. The same topic cannot be selected by multiple students.
Approval Process	The selectedpaper or topic must be approved by the faculty members/ committee appointed by the Head of Department.
Presentation Guidelines	Each student will have 30-40 minutes for their presentation, followed by 5minutes for Q&A.
Evaluation	The presentation will be evaluated by a committee constituted by the Head of Department. The evaluation will be based on:

Parameters for the Evaluation of Seminar

Sr. No.	Parameters	Marks Allotted	COs
1	Clarity of the topic	10	**CO1**
2	Literature Survey	10	**CO2**
3	Content Relevancy	10	**CO3**
4	Presentation Skills	10	**CO4**
5	Q&A Response	10	**CO5**

Course Code	**DISS-MTMA-217A**				
Category	Dissertation				
Course Title	**Dissertation (Phase-1)**				
Scheme and Credits	L	T	P	**Credits**	**Semester-III**
	0	0	4	2	
Course Objectives	The objectives of this course are to • Introduce students to identifying research topics relevant to field. • Explain the research process, including literature review, documentation, and structured writing. • Develop proficiency in using research tools, reference management, and academic writing techniques. • Enhance ability to analyze, synthesize, and present research findings in a chosen domain.				
Assessment	100 Marks				
End Semester Examination	-				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to

COs	Skills Demonstrated
CO1	Identify the research topic/area relevant to the field to carry out independent research.
CO2	Understand the research process, literature review, result formulation and writing conclusions with reference to existing literature.
CO3	Apply appropriate tools, references and writing skills for effective report writing related to research work.
CO4	Analyze and synthesize research findings to the agreed area of research carried out.
CO5	Evaluate the research methods and available knowledge to propose appropriate solutions to the specific research problem.
CO6	Design engineering solutions by developing improved results, properly documenting them in a thesis or report, and publishing them in journals or conferences.

Each student will undertake their dissertation under the supervision of one or more supervisors. The dissertation topic must be approved by a committee constituted by the Head of the concerned Department.

Students are required to deliver two seminar presentations: the first, at the beginning of Dissertation Phase-I, to outline the scope of the work and finalize the topic; the second, towards the end of the semester, to present the progress and work completed during the semester.

The committee will evaluate both presentations and award sessional marks out of 100. Students who fail to secure the minimum passing marks must improve their grade before proceeding to the 4th semester. Failure to do so will require the student to repeat Dissertation Phase-I in the next regular 3rd semester.

Course Code	**DISS-MTMA-202A**				
Category	Dissertation				
Course Title	**Dissertation (Phase-II)**				
Scheme and Credits	L	T	P	**Credits**	**Semester-IV**
	0	0	20	20	
Course Objectives	The objectives of this course are to • Introduce research fundamentals and help identify topics in relevant field. • Understand structured research methodology, literature review, and documentation of results and conclusions. • Develop skills in using research tools, technical writing, referencing, and report formatting. • Analyze, evaluate, and present research findings through effective report or thesis preparation.				
Assessment	250 Marks				
End Semester Examination	500 Marks				
Total	750 Marks				
Duration of Exam	03 Hours				

Course Outcomes: After successful completion of this course, the students will be able to:

COs	**Skills Demonstrated**
CO1	Identify the research topic/area relevant to the field to carry out independent research.
CO2	Understand the research process, literature review, result formulation and writing conclusions with reference to existing literature.
CO3	Apply appropriate tools, references and writing skills for effective report writing related to research work.
CO4	Analyze and synthesize research findings to the agreed area of research carried out.
CO5	Evaluate the research methods and available knowledge to propose appropriate solutions to the specific research problem.
CO6	Design engineering solutions by developing improved results, properly documenting them in a thesis or report, and publishing them in journals or conferences.

Dissertation Stage-I will continue as the final dissertation in the 4th semester. Sessional marks, out of 250, will be awarded by an internal committee constituted by the Head of the Department. The assessment will be based on presentations, reports, and related materials submitted to the committee. Failure to appear before the committee will result in disqualification from submitting the dissertation.

If a student scores less than 40% in the sessional assessment, they must revise and resubmit the dissertation after incorporating all required corrections and improvements. The revised dissertation will be evaluated in the next academic session.

At the end of the semester, each student is required to submit three soft-bound copies of their Master's dissertation to the office of the Head of the Department. One copy will be retained for departmental records, one will be provided to the supervisor, and one will be sent by mail to the external examiner, following their appointment and notification from the university.

The dissertation will be evaluated by a committee consisting of the Head of the Department, the dissertation supervisor(s), and one external examiner. The external examiner will be appointed by the Chairman of the Board of Studies. If the appointed examiner is unable to attend, the Director of the Institute, upon the recommendation

with the Head of the Department, is authorized to appoint a substitute examiner from another institution or the parent institute.

Students must defend their dissertation through a presentation before the evaluation committee, which will assign marks accordingly.

Note:

- The scheme for awarding grades will be provided by the department to the examiner(s).
- The plagiarism of the dissertation report must be below 10%; otherwise, the report will not be accepted.
- Students have to publish a research paper in a journal / conference of the research work done before the final submission of Dissertation.
- The student must follow the guidelines for the Dissertation report.